



U.S. Department
of Transportation

**Federal Aviation
Administration**

Memorandum

Subject: Action: Review and Concurrence, 25.1309 Equivalent
Level of Safety Finding for the Embraer Model ERJ-170
FAA Project Number TC0056IB-T

Date: July 11, 2003

Reg Ref: §§25.1301(d), 1309

From: Manager, TSS Safety Management Branch, ANM-117


Reply to: Linh Le
Attn of: ANM-117

To: Manager, International Branch, ANM-116

ELOS: TC0056IB-T-HSI-15
Memo #:

Background

The FAA, CTA, and Embraer recognized that the ERJ-170's highly integrated system architecture demanded an integrated safety assessment taking into account the interaction between aircraft systems at the aircraft level in addition to the system level assessment traditionally performed for stand-alone system architectures. To this end, all parties recognized that a FAA/JAA harmonized proposal submitted by the Aviation Rulemaking Advisory Committee (ARAC) for revision to §§25.1301, 1309, and a new 1310 provides appropriate requirements and associated guidance. The new §25.1310 is equivalent to the current §25.1309(e) and (f). Although this ARAC proposal for the most part maintains the safety objectives of the current regulations, there is an increased level of safety in certain respects, as shall be described later in this memo.

The above ARAC recommendation has been made available to the public via a Notice of Availability that was published in the al Register on April 29, 2003. FAA policy allows applicants to use the ARAC recommendations as a basis for equivalent level of safety finding or exemption.

The Brazilian CTA has written a FCAR HSI-15 (CTA Issue Paper Equivalent) that requires Embraer to comply with the ARAC recommended rules. The FAA accepts this approach for FAA certification, as an equivalent level of safety to the existing §§25.1301 and 1309 rules.

Applicable current regulation(s)

§§ 25.1301, 25.1309

Regulation(s) requiring an ELOS

§§ 25.1301, 25.1309

Description of compensating design features or alternative standards that allow the granting of the ELOS (including design changes, limitations or equipment need for equivalency)

The proposed rule, submitted by ARAC and forwarded for publication as an NPRM, maintains the principles of the existing rules and associated advisory materials, but also strengthens the existing rules in several areas:

- Most importantly, the new §25.1309 explicitly includes a fail-safe design requirement that single failures must not result in catastrophic failure conditions, regardless of their probability. Although this has been industry and FAA practice, it is presently provided as guidance material in AC 25.1309-1A, and not in the regulation.
- The proposed §25.1309 rule's applicability is broadened as it eliminates the reference to equipment, systems, and installations whose proper functioning is required by *this subchapter*. Thus any and all installed equipment or system in the airplane will be covered.
- In contrast to the historical application of §25.1309 as a rule of general applicability (i.e. it is applicable unless it conflicts with more specific requirements contained in other sections of part 25, the new §25.1309 is applicable in addition to specific regulations that may apply, except where it is explicitly excepted.
- Rather than only providing a “warning” to the flight crew as required by the existing rule, the proposed rule requires that information concerning unsafe system operating conditions be provided to them. A warning indication is still required if immediate action by a flight crew member is required.

There is a provision in the proposed §25.1309 to relieve from the “perform as intended” requirement for equipment and systems with no safety effect (entertainment displays, audio systems, in-flight telephones, non-emergency lighting, etc...) on the operation of the airplane. This provision reduces the cost of certification to airplane and equipment manufactures without reducing the level of safety provided by the current rules.

Explanation of how design features or alternative standards provide an equivalent level of safety to the level of safety intended by the regulation

As discussed above, the proposed §§25.1301, 1309, 1310 maintains the level of safety of the current standards, and raises the level of safety for §25.1309

FAA approval and documentation of the ELOS

The FAA has approved the aforementioned Equivalent Level of Safety Finding as documented in Centro Técnico Aeroespacial Ficha de Controle Assuntos Relevantes HSI-15. This memorandum provides standardized documentation of the ELOS that is non-proprietary and can be made available to the public. The Transport Directorate has assigned a unique ELOS Memorandum number (see front page) to facilitate archiving and retrieval of this ELOS. This ELOS Memorandum number should be listed in the Type Certificate Data Sheet under the Certification Basis section. [E.g. Equivalent Safety Findings have been made for the following regulation(s):

§ 25.1309 Equipment, Systems, and Installations (documented in TAD ELOS Memo TC0056IB-T-HSI-15)]

Manager, TSS, Safety Management Branch, ANM-117

Date

ELOS Originated by: Standards Staff, Safety Management Branch	Staff Engineer Linh Le	Routing Symbol ANM-117
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